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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 09/506,425 | 02/17/2000 | Sara Giordani | AM-3751 | 7521 |

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03/27/2002

Patent Counsel MS 2061
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EXAMINER

OLSEN, ALLAN W

ART UNIT

PAPER NUMBER

1746

7

DATE MAILED: 03/27/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

ME-7

| | | | |
|------------------------------|------------------------|---------------------|--|
| Office Action Summary | Application No. | Applicant(s) | |
| | 09/506,425 | GIORDANI, SARA | |
| | Examiner | Art Unit | |
| | Allan W. Olsen | 1746 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 February 2000.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-26 is/are pending in the application.
- 4a) Of the above claim(s) 17-22, 25 and 26 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4, 10 and 13-16 is/are rejected.
- 7) ☒ Claim(s) 5-9, 11, 12, 23 and 24 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 17 February 2000 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|---|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input checked="" type="checkbox"/> Interview Summary (PTO-413) Paper No(s). <u>6</u> . |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) <u>4, 5</u> . | 6) <input type="checkbox"/> Other: |

DETAILED ACTION
Election/Restrictions

Restriction to one of the following inventions is required under 35 U.S.C. 121:

- I. Claims 1-24, drawn to a method of etching, classified in class 216, subclass 039.
- II. Claim 25, drawn to an apparatus, classified in class 156, subclass 345.
- III. Claim 26, drawn to a recordable medium, classified in class 428, subclass 064.2.

The inventions are distinct, each from the other because of the following reasons:

Inventions I and II are related as process and apparatus for its practice. The inventions are distinct if it can be shown that either: (1) the process as claimed can be practiced by another materially different apparatus or by hand, or (2) the apparatus as claimed can be used to practice another and materially different process. (MPEP § 806.05(e)). In this case the process can be carried out without computer automation.

Inventions I and III are related as product and process of use. The inventions can be shown to be distinct if either or both of the following can be shown: (1) the process for using the product as claimed can be practiced with another materially different product or (2) the product as claimed can be used in a materially different process of using that product (MPEP § 806.05(h)). In the instant case the invention of group I can be carried out without automation, therefore, it does not require the recordable medium of the group III invention.

Inventions II and III are related as combination and subcombination. Inventions in this relationship are distinct if it can be shown that (1) the combination as claimed

does not require the particulars of the subcombination as claimed for patentability, and (2) that the subcombination has utility by itself or in other combinations (MPEP § 806.05(c)). In the instant case, the combination as claimed does not require the particulars of the subcombination as claimed because the combination does not require the transfer information from a recordable medium to the apparatus, that is, the recordable medium does not program the apparatus of the combination. Additionally, the combination does not require that byproducts formed during the etching of the shaped cavity be removed from the shaped cavity during continued etching. The subcombination has separate utility such as storing data not related to the etching process of claims 1-24.

Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.

This application contains claims directed to the following patentably distinct species of the claimed substrate material: silicon (i.e. single crystal silicon, see interview summary) - claims 10-12 and 24; polysilicon – claim 17; silicon oxide - claim 18; silicon nitride - claim 19; metal - claims 20 and 21; polyimide - claim 22.

Applicant is required under 35 U.S.C. 121 to elect a single disclosed species for prosecution on the merits to which the claims shall be restricted if no generic claim is finally held to be allowable. Currently, claims 1-9, 13-16 and 23 are generic.

Applicant is advised that a reply to this requirement must include an identification of the species that is elected consonant with this requirement, and a listing of all claims

readable thereon, including any claims subsequently added. An argument that a claim is allowable or that all claims are generic is considered nonresponsive unless accompanied by an election.

Upon the allowance of a generic claim, applicant will be entitled to consideration of claims to additional species which are written in dependent form or otherwise include all the limitations of an allowed generic claim as provided by 37 CFR 1.141. If claims are added after the election, applicant must indicate which are readable upon the elected species. MPEP § 809.02(a).

Should applicant traverse on the ground that the species are not patentably distinct, applicant should submit evidence or identify such evidence now of record showing the species to be obvious variants or clearly admit on the record that this is the case. In either instance, if the examiner finds one of the inventions unpatentable over the prior art, the evidence or admission may be used in a rejection under 35 U.S.C. 103(a) of the other invention.

During a telephone conversation with Shirley Church on January 1, 2002 a provisional election was made with traverse to prosecute the invention of group I (claims 1-24). Within group I applicant elected single crystal silicon as the substrate specie (claims 10-12, 24 and generic claims 1-9, 13-16 and 23). Affirmation of this election must be made by applicant in replying to this Office action. Claims 17-22, 25 and 26 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Drawings

The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference character "110" has been used to designate both the bottom of the shaped open and the shaped cavity. They also fail to comply with 37 CFR 1.84(p)(5) because they do not include the reference number "412" mentioned on page 21, line 25 of the specification, as being an etching chamber in figure 4. However figure 4 uses the reference number 12, which is not described in the specification. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Specification

The disclosure is objected to because of the following informalities:

page 19, line 9 - reference number "106" is incorrect;

reference number 108 is depicted in the figures and described in the specification as the sidewall of the shaped opening. However, at page 5, line 8 and page 15, line 19, "108" is referred to as the bottom of the shaped opening;

As noted in the above objection to the drawings, the reference number 110 is used to depict both the bottom of the shaped opening and the underlying shaped cavity. Likewise the specification uses "110" in reference to the bottom of the shaped opening as well as in reference to the shaped cavity. See page 5, lines 5 and 10, page 14, lines 9 and 10 and page 19, lines 4, 5, 7 and 10.

The specification defines the reference number 400 as being representative of a computer (page 21, line 21). However on page 21, line 27 and page 22, line 2, the computer is referred to by the reference number 402. Reference number 402 was defined at page 21, line 22 as a processor.

Appropriate corrections are required.

Claim Objections

The numbering of claims is not in accordance with 37 CFR 1.126 which requires the original numbering of the claims to be preserved throughout the prosecution. When claims are canceled, the remaining claims must not be renumbered. When new claims are presented, they must be numbered consecutively beginning with the number next following the highest numbered claims previously presented (whether entered or not).

Misnumbered claim 28 has been renumbered 26.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 10 and 24 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 10 and 24 recite in part "wherein said substrate comprises silicon". This application was examined with the understanding that applicant intends the term "silicon" to mean single crystal silicon. As such a substrate that comprises, for example, silicon oxide, silicon nitride, polysilicon or a silicide, would not according to applicant's definition, be a substrate which comprises "silicon". This definition became made known to the examiner only as a result of a telephonic interview conducted as part of a telephonic restriction requirement. As a result of this interview, Applicant's definition of this term has clearly been made of record. However, to ensure that this meaning is not effectively hidden from public disclosure, the specification and or claims should explicitly recite what Applicant's mean by the limitation "wherein said substrate comprises silicon".

Claim 23 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 23 recites "wherein said method includes performing the following steps prior to etching said shaped cavity". The next several limitations which are recited are in fact directed to process steps that would be performed prior to the etching of the shaped cavity. However, the continuing list of process steps that are supposedly performed prior to the etching of the shaped cavity are limitations directed to the actual etching of the shaped cavity. As such, these latter limitations cannot, as is required by the claim, take place prior to the etching of the shaped cavity.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) do not apply to the examination of this application as the application being examined was not (1) filed on or after November 29, 2000, or (2) voluntarily published under 35 U.S.C. 122(b). Therefore, this application is examined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

Claims 1-4, 10 and 13-16 are rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent 5,891,807 issued to Muller et al. (hereinafter, Muller).

Muller teaches a method of etching a shaped cavity. Muller teaches that the shaped cavity may be obtained through a multi-step etching process in which the pressure in the plasma chamber is reduced about 30% (110 mTorr to 80 mTorr or 150 mTorr to 100 mTorr, see column 5, line 43 and column 6, lines 8 and 33). Muller teaches silicon comprising substrate and an etchant that comprises HBr, NF₃, He and O₂. See: figures 1A and 1B; column 2, lines 15, 16, 31-51; column 3, lines 14-20; column 5, lines 39-43.

Allowable Subject Matter

Claims 5-9, 11 and 12 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claims 23 and 24 would be allowable if rewritten so as to overcome their respective rejection under 35 U.S.C. 112, second paragraph, set forth in this Office action and also to include all of the limitations of the base claim and any intervening claims.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Kurasaki (U.S. 5,013,400) may be applied to reject at least claims 1, 2, 10, 13, 14 under 35 U.S.C. 102. Likewise, Hung (6,071,823) qualifies as 102 prior art on at least claims 1 and 2. However, In view of the rejection over Muller, neither Kurasaki nor Hung are, at this time, being applied against the instant claims. Nevertheless, these references should be carefully considered.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Allan Olsen whose telephone number is (703) 306-9075. The examiner can normally be reached on Monday through Friday from 9:30 to 6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Randy Gulakowski, can be reached on (703) 308-4333. The fax phone number for this Group is (703) 305-7719.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-0661.

Allan Olsen, Ph.D.
March 9, 2002

Allan C. Olsen
Patent Examiner
A.U. 1746